PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference F618PCT	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/JP2004/019551	International filing date *(day/month/year)* 27 December 2004 (27.12.2004)	Priority date *(day/month/year)* 13 January 2004 (13.01.2004)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant MURATA MANUFACTURING CO., LTD.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 22 August 2006 (22.08.2006)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Masashi Honda
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Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

	Date of mailing *(day/month/year)*
Applicant's or agent's file reference F618PCT	FOR FURTHER ACTION See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/JP2004/019551	27.12.2004	13.01.2004

International Patent Classification (IPC) or both national classification and IPC

Applicant
MURATA MANUFACTURING CO., LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☒ Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Authorized officer
Facsimile No.	Telephone No.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/019551

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material

      ☐ in written format

      ☐ in computer readable form

   c. time of filing/furnishing

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in computer readable form.

      ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/019551

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-9	YES
	Claims		NO
Inventive step (IS)	Claims	3, 5	YES
	Claims	1, 2, 4, 6-9	NO
Industrial applicability (IA)	Claims	1-9	YES
	Claims		NO

2. Citations and explanations:

Document 1: Ayumu NAKAJO, Kazuhiko YAMANOUCHI, Inuo SHIBAYAMA, "Sojo Kozo Kiban ni Okeru Den'atsusei Kyokaiha", Denshi Tsushin Gakkai Gijutsu Kenkyu Hokoku, US80-4, 1980, pages 21 to 28

Document 2: JP 10-247835 A (Kokusai Electric Co., Ltd.), 14 September 1998, Par. Nos. 0010 to 0013, 0025; Figs. 3, 4 (Family: none)

Document 3: JP 10-233647 A (NGK Insulators, Ltd.), 02 September 1998, Par. No. 0013 (Family: none)

Claim 1:

Claim 1 does not appear to involve an inventive step based on documents 1 and 2 cited in the ISR.

Document 1 describes a boundary acoustic wave device comprising a piezoelectric body, a dielectric body formed over one side of the piezoelectric body and an electrode provided at the boundary between the piezoelectric body and the dielectric body, the device using a Stoneley wave for propagation through the boundary, wherein waves can be trapped in the vicinity of the boundary by making the sound speed of the Stoneley wave smaller than the sound speed of a fast transversal wave propagating through the dielectric body. It is obvious that waves also can be trapped in the vicinity of the boundary, thereby preventing waves from escaping into the piezoelectric body, by making the sound speed of the Stoneley wave smaller than the sound speed of the fast transversal wave propagating through the piezoelectric body.

Document 2 describes reducing the sound speed of a wave by increasing the thickness of an electrode.

Therefore, reducing the sound speed of a wave in the boundary acoustic wave device of document 1 by increasing the thickness of an electrode would be obvious to a person skilled in the art.

Claims: 2 and 4

The inventions of claims 2 and 4 do not appear to involve an inventive step based on documents 1 to 3 cited in the ISR.

Document 3 describes reducing the sound speed of wave by changing the duty ratio of a strip.

Therefore, reducing the sound speed of wave in the boundary acoustic wave device of document 1 by changing the duty ratio of a strip would be obvious to a person skilled in the art.

Also, document 2 describes reducing the sound speed of a wave by increasing the thickness of an electrode.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 6:

The film thickness conditions that yield zero propagation loss in a Stoneley wave change when conditions such as medium substance, cutting angles or the like of a piezoelectric body and a dielectric body vary, and when the duty rate of an electrode changes. In spite of this, no recitation is found in the description or elsewhere bearing out that the conditions for achieving a zero propagation loss in a Stoneley wave can be fulfilled just by having the electrode film thickness H satisfy the function "H> $1/\{1/3 \times 10^7 \times \rho^{-2.22}+0.017)-0.4)\}$" *vis-à-vis* the electrode density ρ alone.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

Claims: 6 - 9

The inventions of claims 6-9 do not appear to involve an inventive step based on documents 1 and 2 cited in the ISR.

Document 2 recites that the sound speed of a wave can be reduced by increasing the density ρ of an electrode, and/or increasing a film thickness H. Using an electrode material having a given density ρ as the electrode material in a piezoelectric boundary wave device, using a material having density ρ of 4711 kg/m^3 or more, or using a material having a density ρ higher than 2699 kg/m^3 are arbitrary design choices that a person skilled in the art can make in accordance with a desired sound speed value. Setting the electrode film thickness H of the piezoelectric boundary wave device to a given value, or setting the film thickness H to a value higher than 0.03 λ, or to $H> 1/\{1/3 \times 10^7 \times \rho^{-2.22}+0.017)-0.4)\}$ are arbitrary design choices that a person skilled in the art can make in accordance with a desired sound speed value.

Document 2 describes an electrode having as a main component of an electrode layer at least one element selected from the group consisting of Ag, Au, Cu, Fe, Mo, Ni, Ta, W, Ti and Pt.

Claims: 3 and 5

Documents 1 to 3 do not describe or suggest a boundary acoustic wave device comprising an electrode disposed at the boundary between a piezoelectric body and a dielectric body, such that the piezoelectric body comprises as a main constituent thereof LiNb3 with Euler angles (30, 90, 225) or the like, the device using a Stoneley wave having a sound speed smaller than 3757 m/s.